

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Daisuke KANENARI

Group Art Unit: 1791

Serial No. 10/572,549

Examiner: FISCHER, Justin R

Filed: March 17, 2006

For: LAMINATE AND PNEUMATIC TIRES MADE BY USING THE SAME

DECLARATION UNDER RULE 132

Honorable Commissioner of Patents and Trademarks

Washington, D.C. 20231

Sir:

I, Daisuke KANENARI, a citizen of Japan, residing at
2-1, Oiwake, Hiratsuka, Kanagawa, Japan respectively,
sincerely and solemnly declare:

That I am by profession a research chemist and
that I graduated from Yamagata University, Faculty of
Engineering and Department of Applied Chemistry, on March,
1992 and finished from Interdisciplinary Graduate School of
Research and Engineering, Majored to Applied Chemistry, on

March, 1994. Since April, 1994, I have been employed by THE YOKOHAMA RUBBER Co., Ltd. and have been engaged in research, as a researcher, especially research and developments of new tire materials, compoundings of tires and new rubber raw materials in the Development Center of The YOKOHAMA RUBBER CO. LTD., at present, as a manager of Tire Research and Technology Development Department.

THAT I am the inventor of the invention of the above-identified U.S. Patent application, which is referred to as "the present invention" hereinbelow, and am, therefore, completely familiar with the present invention;

THAT I have read and understand the Final Office Action mailed March 23, 2009, and the Advisory Action mailed June 18, 2009, with respect to the above-identified application; and

THAT in order to show the patentability of the present invention over the inventions set forth in the cited references, Hashimura (US'557) and further in view of Dollinger (WO'538), Ohtsuka (JP'629) and Asahara (US'319) under 35 USC 103(a), the following Experiments were carried out under my direction and supervision.

EXPERIMENTS I - V

An adhesive composition of each formulation shown in Table A was mixed by a single-screw extruder having a screw diameter of 40 mm ϕ and passed through an anti-sticking solution, then was cut by a cutter into pellets. On the other hand, a thermoplastic elastomer composition having the formulation shown in Table B was mixed by a twin-screw extruder, then cooled in water and cut by a cutter into pellets. These pellets were extruded using 50 mm ϕ and 75 mm ϕ extruders and cylindrical stacking dies into cylindrical shapes having thicknesses of 50 μ m and 150 μ m. The test films thus obtained were subjected to the following tests.

An adhesive composition of each formulation shown in Table A and the thermoplastic elastomer sheet shown in Table B were extruded using 50 mm ϕ and 75 mm ϕ extruders and tubular stacking dies into cylindrical shapes having thicknesses of 50 μ m and 150 μ m. The resultant laminate was cut to a band having a width of 1 cm and attached to the ring part of the tack tester, which was then pressed perpendicularly against a 10 cm square piece cut from the

same sheet in the case of self tack and against the unvulcanized carcass member in the case of tack with the carcass layer. The force, when peeling off the same, was measured. The measurement was conducted using a Toyoseiki PICMA tack tester under the following conditions. The results are shown in Table A.

Measurement Conditions

Dimensions of top sample:	12.7 mm × 152 mm
Press load:	4.90N
Peeling speed:	120 mm/min
Press time:	0 second
Temperature:	20°C
Relative humidity:	65%

As is clear from the results shown in Table A, in Experiment III according to the present invention, in which the weight ratio of (A):(B) is 40:30 (i.e., 57.1:42.9), both the self tack and the tack with the carcass are excellent.

Contrary to this, in Comparative Experiments I and II, in which the aromatically modified terpene resin was not

compounded, both the self tack and the tack with the carcass thereof are inferior to those obtained in Experiment III, where the terpene resin (A) and the aromatically modified terpene resin (B) were used in the weight ratio (A):(B) of 57.1:42.9.

Furthermore, in the additional Comparative Experiments IV and V, in which the weight ratio of (A):(B) are 30:40 (i.e., 42.9:57.1) and 55:15 (i.e., 78.57:21.43), respectively, both of which are the outside of the range of the present invention (i.e., 70:30 - 50:50), the self tack and the tack with the carcass are inferior to those obtained in Experiment III, as show in the attached Table A.

CONCLUSION

As is clear from the above results shown in Table A and based upon my knowledge and experiences, I conclude that, when the terpene resin (A) having an Mw of 1000 or less and a softening point of 60 - 120°C is used in combination with the aromatically modified terpene resin (B) having an Mw of 1000 or less and a softening point of 60 - 120°C in a weight ratio of (A):(B) = 70:30 to

50:50, the resultant laminate of an air permeation preventive layer/an adhesive layer according to the present invention are unexpectedly superior to those obtained by the cited references.

Thus, I believe that the present invention is by no means obvious from the cited references.

Table A: Formulation of Adhesive Composition

	Experiment				
	I*1	II*1	III*2	IV*1	V*1
Formulation (parts by weight)					
Epoxyated SBS (Epofriend A1020, Daicel Chemical Industries)	80	50	50	50	50
SBS (Tufprene A, Asahi Kasei)	20	50	50	50	50
Terpene resin (YS Resin D-105, Yasuhara Chemical) (A)	70	70	40	30	55
Aromatically modified terpene resin (YS Resin TR-105, Yasuhara Chemical) (B)	-	-	30	40	15
Zinc oxide (Zinc White #3, Seido Chemical)	5	5	5	5	5
Stearic acid (Beads Stearic Acid, Kao)	1	1	1	1	1
Organic peroxide (Parkerdox 14, Kayaku Akzo)	1	1	1	1	1
Test results					
Self tack (N)	3.0	3.4	4.8	5.8	4.3
Tack with carcass (N)	5.9	7.4	10.1	7.0	8.5

*1: Comparative

*2: Present Invention

Table B: Formulation of Thermoplastic Elastomer

Name of material	Name of product	Manufacturer	Formulation amount (parts by weight)
Br-IPMS	EXXPRO 89-4	Exxon Mobil Chemical	100
PA 6/66	Ube Nylon 5033B	Ube Industries	30
PA 11	Rilsan BESN O TL	Atofina Japan	40
Zinc oxide	Zinc White #3	Seido Chemical	0.2
Stearic acid	Beads Stearic Acid	Kao	0.5
Zinc Stearate	Zinc stearate	Seido Chemical	0.3
Plasticizer	BM-4	Daihachi Chemical Industry	10
Antioxidant	Irganox 1098	Ciba Specialty Chemicals	0.5

I, the undersigned declarant, declare further that all Statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and; further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001, of Title 18, of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 3rd day of August , 2009.


Daisuke KANENARI